Forest
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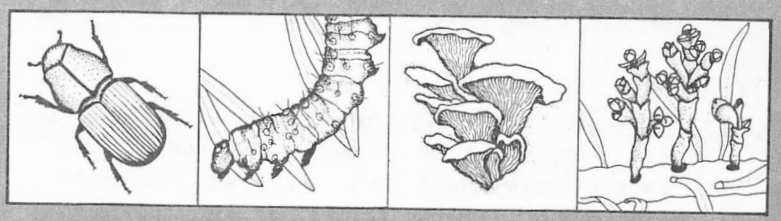

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ENGELMANN SPRUCE NEEDLE AND TWIG BLIGHT AT THE COEUR D'ALENE NURSERY, IDAHO

By

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INTRODUCTION

Needle and twig blight of Engelmann spruce (Picea engelmannii Parry) at the Coeur d'Alene Forest Tree Nursery was recently investigated to determine probable causes and formulate recommendations for reducing future losses. The disease occurred during the spring of 1980 on 2-0 seedlings within bareroot stock beds.

Affected trees displayed extensive dying of current year's foliage with progressive necrosis into twigs (figs. 1 and 2).

Seedling terminals and lateral branches mostly were affected (fig. 2). Necrosis sometimes began near the ground line and progressed upward through seedlings (fig. 1), although mortality was rare. Affected seedlings were often in groups.

METHODS

Microscopic examinations were made of necrotic tissues from symptomatic seedlings. Portions of these tissues were also aseptically placed on 2 percent water agar and incubated at room temperature (ca 24° C.) for 7 to 10 days. Emerging fungi were reisolated onto potato dextrose agar slants and identified using Barnett's (1) key. Inoculation - pathogenicity tests were not conducted.

RESULTS AND DISCUSSION

The two major fungal genera consistently isolated from symptomatic seedlings were Phoma and Botrytis. Isolates of Phoma produced black, flask-shaped pycnidia measuring 150-180 µm in height by 110-150 µm in diameter.

Pycnidia were erumpent within necrotic host tissues and produced hyaline, one-celled conidia approximately 4 to 7 µm in length and 2 to 3 µm in width. When fruiting bodies were immersed in water, conidia exuded in gelatinous cirri through pycnidial ostioles.

Isolates of Botrytis obtained from necrotic tissues produced typical naked, ash-gray to hyaline conidiophores bearing clusters of conidia on short sterigmata. Conidia were light gray in mass, ovoid, and one celled. Botrytis isolates commonly produced black, irregular shaped sclerotia in culture.

Although pathogenicity tests were not conducted, consistent isolation of Phoma and Botrytis from symptomatic seedlings implicates these two fungi in disease etiology. Both genera have commonly been associated with similar diseases of coniferous seedlings (6, 11, 15, 20).

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Phoma spp. are ubiquitous soil fungi (5, 12, 21), many forms of which are saprophytic on dead plant material (3). However, important diseases of potatoes (2, 12, 3) and crucifers (23) have also been associated with this genus.

Foliage blights of Douglas-fir (20), lodgepole pine (11), pacific yew (8), various spruce species (7, 18, 22), grand fir (10), arborvitae (17), and poplar (19) have reportedly been caused by Phoma spp.

Botrytis spp. are commonly associated with gray mold of coniferous seedlings, especially when grown within greenhouses (6, 15). These fungi also often cause serious economic losses to other greenhouse-grown crops (9, 16).

Parasitic forms of Phoma and Botrytis behave similarly; they often display weak pathogenicity with serious disease levels common only after predisposing environmental and cultural conditions (3, 6). These fungi are usually saprophytic on necrotic tissues (4, 14);

Figure 1. -- Engelmann spruce seedlings displaying needle and twig blight at the Coeur d'Alene Nursery.

Figure 2.--Engelmann spruce seedlings with symptoms of needle and twig blight. Note curved leader.

however, during cool, wet weather they may attack and kill relatively healthy seedlings (11, 16). Phoma spp. are often splashed from the soil onto seedling foliage during heavy rains and may cause infection if inoculum levels are high (11, 20).

Diseases caused by Phoma and Botrytis can usually be effectively controlled with fungicides. Chlorothalonil (BRAVO 6F) is registered for Phoma (20) and is most effective when applied at 2-week intervals during cool, wet weather (primarily spring and fall at the Coeur d'Alene Nursery). Soil fumigation prior to each crop should help maintain low inoculum levels. Reducing seedling density within beds may reduce losses by providing air circulation to help maintain drier foliage.

Fungicide application has traditionally been used to control Botrytis blight. Chemicals are usually applied when seedling crowns begin to close (6, 15). However, development of tolerance to certain chemicals by various strains of the fungus has been reported (6, 16). Therefore, spray recommendations should include different chemicals applied alternately to help preclude selection for tolerance by the fungus. Unfortunately, no fugicides are currently registered for Botrytis at the Coeur d'Alene Nursery. Work is progressing to obtain the necessary registrations to reduce losses from this important pathogen.

This publication refers to pesticides. It does not contain recommendations for their use, nor does it imply that the uses discussed have been registered.

CAUTION: Pesticides can be injurious to humans, domestic animals, desirable plants, and fish or other wildlife--if they are not handled or applied properly. Use all pesticides selectively and carefully. Follow recommended practices for the disposal of surplus pesticides and pesticide containers. All uses of pesticides must be registered by appropriate State and/or Federal agencies before they can be recommended.

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